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Issues in Development Research
The case of Water in Kenya

by

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Since the application of science to policy adds a self conscious demension to policy, it seems appropriate that the scientific frame work for this application also be self conscious. Self consciousness in science begins with an examination of its deductive system or its a priori system of logic.

2. These are some of the philosophical issues which from my point of view need to be thought through before a useful water research program can be designed. Some of these issues have been raised explicitly or implicitly by others. Some I raise myself as a means of critiquing what appear to be fallacies or contradictions in logic of some of the statements I have studied. My basic thesis for this whole discussion is this: if science is used in formulating policy prior to empirical studies, as it frequently is, the deductive propositions upon which this policy is based tend to predetermine the implicit hypothetical system as well as the explicit hypotheses for research and evaluation. This may invalidate or, at the very least, minimize the effectiveness of research and evaluation.

I. 3. The issue of the dynamic interrelationships of science and policy, or the interrelationships of science and policy at various stages of the planning and development process.

4. It seems to me water research at this stage in Kenyan Development begins with the acceptance of three realities:

1) Water and systems for the use of water are universal.
2) There are no data streams on these systems.
3) A Kenyan water development policy exists and is becoming an operational reality.

5. There is no such thing as an absence of water supplies or an absence of technologies for their use. Wherever people are located they will have systems for the utilization of water just as they will have for the use of land and ecology generally. In the midst of numerous and various existing water systems and at the stage of virtually zero knowledge of these systems, a national water development policy begins. This is the stage on which or at which a player called water research appears with a fistful of scenerios but no script.

6.Planned development must begin somewhere. If policy planners waited until the existing situation was empirically known to them, it probably would not begin since the compelling reason for knowing the situation would not exist were it not for policy. It is a central fact of development research's existence, that it is more a consequence of policy than a cause.

7.This genesis commits research to the priorities of policy if for no other reason than the fact that policy is always one step ahead of it. Thus it is historically inevitable as well as morally proper, or should I say "economically necessary", that development research is heavily biased toward application. But the effects of this peculiar genesis do not end there. The effects frequently intrude into the logics of the research process itself.

8.In the urgency of human needs and political necessities and to add redundantly, in the absence of empirical data, the initial role of science is to form a priori rationale. That is scientists help planners speculate about the situation scientifically. If the scientists are economists, the rationale they provide planners will be heavily biased in terms of production efficiencies or economic benefits over economic costs to a theoretical national economy. If the advisors are sociologists, rationale will be biased in terms of consumption or welfare effeciencies or social benefits over social costs to a theoretical national society. If the advisors should happen to be anthropologists, policy rationale would be biased in terms of its effects on quality of life and viability of a particular cultural group, society or community.

9.Ignoring for the moment, the kind of bias in rationale, the problem I am stressing is that preconceived rationale developed by science for policy at the planning stage frequently becomes ipso facto the deductive system for research and evaluation, especially when the same person, group or institution functions in both scientific capacities. The result is a kind of exercise in the evaluation of hypothesis making--an evaluation of the rationale of policy as opposed to the evaluation of policy proper. I cite Dennis Warner's impact study or Tanzanian rural water supplies as a case in point:

> The success of any investment made in the cause of development should be gauged in the light of the objectives it sets out to achieve. In the case of rural water supply the intended objectives are rarely specified explicitly. For the most part the intended objectives, as well as the

resulting effects, are left as unspoken, implicit assumptions. The success of programmes often is measured in terms of the number of people served with water per year or, more frequently, the amount of expenditure achieved during the period in question. If water supply investments are made for development purposes, then neither the amount of expenditures nor the totals of population served, by themselves, should be used as measures of success or achievement. Success should be measured against the national development objectives that are related to rural water supply....

> The impact study under the direction of the Economic Research Bureau started with the basic premise that the benefits of an improved rural water supply are those resulting social and economic changes that contribute to the fulfilment of national development objectives.[1]

Warner is confusing policy rationale with policy. The rationale for policy is a thought system and usually not a very comprehensive or consistent one at that. "Testing" this thought system is an intriguing academic exercise, but I am skeptical of its net benefits to planning. Policy is action. More precisely, policy is a system of action. It intersects systems of action participated in and generated by sets of people referred to as "beneficiaries". Therefore both policy and beneficiary behaviour must be seen as open systems of action--open to each--and these systems of action must be empirically derived before the full effects of policy can be determined. Policy rationale or **what** planners say they are doing and why they are doing it, can only partially comprehend these real action systems. It is a deductive model as opposed to empirically abstracted models of behaviour.

10. Scientists are naive to think that even when their hypothesis are incorporated in policy statements, that this is primarily due to their scientific validity. Policy rationalization is aimed primarily at the politics of acceptance and is only secondarily concerned with formulating valid models of policy and beneficiary behaviour. Policy statements are articles of faith appropriate to the sentiments, values and beliefs of the people whose support is needed. The statements may be couched in the values of a predominate ethnic and class group, as recent United States Urban slum policy is rationalized in terms of the sentiments and beliefs of the white middle class. In newly independent countries, development policies will be rationalized in terms of the objectives of the independence movement. If the new order is founded upon a socialist system of thought, propositions will be consistent with socialist ideology.

If it is a capitalistic social system, even the same over-all development objective will be rationalized a different way. Compare the Tanzanian Water Development program with its Kenyan counterpart.[2] When all is said and done, I seriously doubt the over-all effects of either policy will be significantly different--unless, of course, there are large differences in the levels of allocations.

11. The thought system reflected in policy rationale is the result of forces and proceses distinct from the logics of science. This point would be redundant if I were talking about policy-making prior to the fad of hiring the scientific expert. For instance, I doubt there would be any tendency among policy scientists to attach serious scientific significance to the policy utterances of Sir Philip Mitchell, Governor of Kenya during the wanning years of Britain's Colonial rule:

> It is common ground that the great mass of the people of this region (East and Central Africa) are still in a state of ignorance and backwardness, uncivilized, superstitious, economically weak to the point of near helplessness and quite unable to construct a civilized future for themselves, to 'pull themselves up by their own bootstraps'. Universal suffrage or democratic government is unthinkable. If it were allowed, it would merely lead to a 'twentieth-century model' of the slave trade whose abolition had in the first place been the motivation of 'the great men who led the missionary venture of rescue'--the British colonization of Eastern Africa.[3]

These statements would be dismissed summarily as the catechisms of a benevolent chauvinist, and it would be considered and absurd waste of time to scientifically test them and morally wrong to lend scientific expertize in implementing them. To me it is just as inappropriate to frame testable hypotheses about the effects of water development programs in Kenya from policy statements of the Kenyan Government:

> ...Water made available more easily and in larger quantities could significantly raise the level of <u>production</u> per family realizable from small farm cultivation and animal husbandry. The provision of rural water supplies is accordingly regarded by the Government as a fundamental condition for rural development (italics mine).[4]

Kenya's water policy, like Britain's post war colonial policy, is a result of the beliefs and values of the political decision makers. Like most policies, it is rationalized in the most acceptable terms of the day. Water development could just as well be rationalized on the grounds of maintaining political stability. The rightness or wrongness of a policy is to be assessed in terms of the <u>total</u> effects--unintended as well as

intended--not in terms of the prior justifications for it.

12.Policy is no more autonomous than it has ever been. It still is a function of culture. The fact that more recently in the ancient history of policy making, scientists are the chief employees of policy makers as opposed to philosophers, priests, noblemen, generals, aristocrats, poets or medicine men, in no fundamental way changes the process of policy formation or the functions of policy. Science is simply a new stream of inputs into the concensus system of policy formation. The process of policy formation and implementation is not transformed into a scientific exercise by imbedding policy rationale with scientific terms and concepts. It is not de-biased by this consultation, it simply gets another bias--an important one perhaps--but a bias nevertheless.

13.I regard scientific fundamentalism as just another more recent form of absolutism, and some supremely able scientific skeptic of science should warn well meaning planners in developing countries about the perils and pitfalls of placing an absolute value on policy being rationalised in terms of supposedly "objective" quantifiably verifiable criteria. This practice sweeps clear the old familiar people-biases putting in their place new biases which planners will have the expense of discovering at some future date. Scientific fundamentalism in policy, if anything, may further alienate policy from the people--although it may take a scientist to prove this, which would, of course, enable science to save policy from science thus reinforcing scientific fundamentalism.

Deep Issues in Water Supply

II 14.Getting down to specifics in the case of water development research there are a number of a priori tenets which I consider to be the logical consequences of scientists taking scientifically rationalised policy too seriously, or in other words accepting uncritically at the research and evaluation stage, the rationale for the policy formulation and acceptance stage.

15.1)First I think there is a bias of attributing too much singular significance to the development of domestic rural water-supplies. Putting it another way, there is danger of too singular a research emphasis on water development impact given the present and projected levels of expenditure per scheme.

16.There are some very understanable reasons for this bias. Rural Water Development is a very recent policy emphasis. There has been a dramatic increase in the budget for water. There is a paucity of basic

data on all aspects of water. There is considerable donor interest in water, specifically; and of course, physically and technically, water systems are distinctive. But all of these compelling reasons to think of water as a separate entity do not mean that rural water supplies at the levels projected will have economic impacts significant enough to justify the large costs of research to isolate them. For instance after somewhat arbitrarily determining from a number of "inconsistent" policy objectives that the general thrust of Kenya's planning strategy is first to raise national income as a pre-condition to meeting its social objectives, Carruthers goes on to say,

> If the (Kenya) water programme is to reach the high level of £2 million per year within three or four years, the programme has to be consistent with the planning strategy of the country of raising national income. Thus emphasis should be place on schemes which will produce large additions to the national income.[5]

Thus the pivotal premise that leads to a production oriented design for rural water projects and an implied role for research and evaluation in this regard is that Kenya's projected levels of allocation for rural water supplies are too significant to escape the production rule.

17. I consider this premise false. In the first place regardless of the amount of money being spent, the schemes are for human consumption. This is dictated by the capacities of the delivery systems, relative to the numbers of people served. We are not talking about investment in technologies to convert fossil carbons, solar energy, fissionable materials, or even large scale irrigation schemes converting solar energy and arid lands into agricultural output; we are talking about systems for saving human energy, and under the most optimum conditions in a labor-scarce economy where the labor saved has the opportunity of being converted into production on a 1 to 1 basis, the man hours and capital required to build and maintain delivery systems would have to be charged against the man hours converted from water collecting to farm labor or some other hand labor. Another thing to remember in this argument is that the labor theoretically saved is all low cost or unskilled labor, so it is implied that if there is any conversion at all it would be to labor intensive, low productivity systems, so what are we academicians talking about? We are debating in rather pretentious terms the tremendous increases in production which theoretically result from delivering 5 to 10 gallons of unpurified water to within a mile of an unskilled laborer's or small

farmer's house. I identify the beneficiary here in terms of his given productive capacity because the argument is about the production function of small scale rural water schemes. If it were agreed that the production function is negligible, which is what I am saying, then beneficiaries could appropriately be identified simply as human beings with very explicit and universal human needs in regard to water, and the logical foundation laid for a consistent clear-cut strategy for scheme selection and design. It is inherent in the production argument that some people or some production roles are more valuable than others. I agree that this is true and argue that the logics of this premise do not lead to the implementation of 10 gallon per capita delivery systems to low skilled laborers, but should lead instead to the allocation of £2 million to one or two large scale irrigation projects or to industrial use. Obviously this is socially and politically intolerable while the rural population has no water. So in effect the production argument is not confirmed by the level of allocations, given the number of schemes it is supposed to finance and the number of people it is supposed to serve.

18. I have one other argument with this fixed emphasis on the "high level" of water allocations and the implied significance this has for economic cost/benefit research and evaluation. Not only does it lack significance as a production input, but its significance relative to levels of allocations in other sectors must be challenged. I address myself to the thinking exemplified by the following statement:

> Kenya is committing a significant proportion of its development budget to rural water development. Although it is possible that this would be continued even if economic benefits are not resulting, it would be better to take decisions in the light of facts demonstrating the impact of the programme.[6]

The questions I ask are: "What proportion of a budget is significant?" and "What implications does this logic have for decision rules and research priorities for other programs with the same or greater proportions of the budget?"

19. A ranking of programs by size of planned expenditures for 1968/1969 reveals that water supplies ranks ninth out of a total of 37 programs (see Table 1). Health, housing ICDC, livestock, education, railways/harbours, roads, and agriculture rank higher. A better index of significance is the percentage of the development budget water accounts for, which is 4.04 percent. Education is double this percentage. Railways and harbours is two a half times, roads is almost four times and agriculture is five times the planned expenditure on water.

TABLE 1

Ranking of programs by size of Planned Expenditure
for Development 1968/1969* K£'000

	Program	Am't	Pct
1.	Agriculture, excluding livestock	5,842	20.80
2.	Roads	4,401	15.67
3.	Railways and Harbours	3,000	10.68
4.	Education	2,364	8.41
5.	Livestock	1,835	6.53
6.	ICDC	1,400	4.98
7.	Housing	1,200	4.27
8.	Health	1,182	4.20
9.	Water supplies	1,135	4.04
10.	Forestry	1,008	3.58
11.	DFCK	1,000	3.56
12.	Airports	525	1.86
13.	Tourism accommodation	455	1.62
14.	Government Buildings	435	1.54
15.	Local authorities	400	1.42
16.	Armed Forces	396	1.41
17.	Posts & Telecommunications	337	1.20
18.	Prisons	203	.72
↓			
20.	Police	150	.53

Out of 37 programs & K£28,078,000

*Abstracted from Table 2.29, pp.52-55, Republic of Kenya, Development Plan 1970/1974.

TABLE 2

Ranking of programs by size of actual (estimated)
Expenditure for Development 1968/1969* K£'000

	Program	Am't	Pct
1.	Roads	7,385	22.53
2.	Agriculture excluding livestock	6,974	21.27
3.	Education	3,258	9.93
4.	Railways and Harbours	2,910	8.87
5.	Housing	2,000	6.10
6.	Posts & Telecommunications	1,153	3.51
7.	Health	1,150	3.50
8.	Livestock	994	3.03
9.	Forestry	975	2.97
10.	ICDC	945	2.88
11.	Government Buildings	784	2.39
12.	Water supplies	654	1.99
13.	DFCK	450	1.37
14.	Tourism accommodation	361	1.10
15.	Armed Forces	338	1.03
16.	Police	279	.85
17.	Prisons	252	.76
18.	Airports	243	.74
↓			
23.	Local Authorities	100	.30

Out of 37 programs & K£32,778,000

*Abstracted from Table 2.29, pp.52-53, Republic of Kenya, Development Plan 1970/1974.

20. A look at the actual as opposed to planned expenditures for 1968/1969 reinforces my skepticism. (see Table 2). In actual expenditures, water ranks 12th accounting for less than two percent of the budget. Government buildings is 11th, health is 7th, post and tele communications 6th, housing 5th with six percent of the budget, rail and harbours 4th with almost nine percent, education 3rd with 10 percent and agriculture and roads are the giants of the budget, with a whopping 21 and 23 percent respectively--over ten times the expenditure on water.

21. How relatively significant is water ranking in twelfth place with less than two percent of the budget? It would seem much more important by Carruther's logic to ascertain the economic benefits of roads, education, housing, the postal communications and health systems than water supplies. If research priorities were to be rationalized on this basis, actually we scientists have no business dabbling in water until the economic decision rules for some of these other programs are established --such as roads for instance. At least it would seem to a non-economist that an economist could take this point confidently simply on the basis of the hypothetical cost/benefits of research activities to the Kenyan Government.

22. One final look at the projected development expenditures for the year 1973-74[7] does little to enhance the relative significance of water expenditures. Here we are dealing with projected allocations in the neighbourhood of £2 million, a significant increase over £1,135,000 in 1968/1969, but the Kenyan Government is now talking about a total development expenditure of £52,579,000 as opposed to £28,078,000 in 1968/69. So water's increase is virtually zero relative to the increase in expenditures as a whole. It is still in ninth place accounting for 4.47 percent of a projected budget which has almost doubled in the meantime. Parenthetically, I might add that roads still ranks No.1.

23. 2) The second bias I have indirectly discussed in the context of the over-emphasis on water impact, but it is a sufficiently serious bias to merit re-emphasis in a separate discussion. That is the use of economic cost/benefit criteria to develop decision rules for the implementation of policies which are the consequences of welfare norms and social demands. This raises the issue of whether expenditure for rural water supplies is to be regarded as a production input or a welfare input. Clearly Kenya policy rationale regards it as both.

24. There are very compelling reasons why policy statements emphasize the production benefits of a given program. Even though a given policy may be in response to demands altogether at variance with the aim of increasing national productivity and even though the effective system of action may be to increase the welfare of people, it is frequently mandatory and always good to throw in a set of hypothetical justifications having to do with increasing national income. But an unassailable justification for policy easily becomes the conventional proposition for research, implementation and evaluation, making data requirements and analytical designs as inevitable and predictable as the climax of an American cowboy movie.

25. This bias must be challenged. I take the position that the consumption functions of Kenya's rural water expenditures are criterial, not their production functions. I am not substituting welfare fundamentism for production fundamentism or a sociological bias for an economic one. It depends upon the program. Regardless of the rationale for Kenya's rural water program, given the limited expenditures relative to other programs, the policy of maximizing the number of schemes relative to these expenditures, their low per capita capacities, their geographical dispersion, coupled with the social demand for piped water in excess of program commitments--all, lead me to the working premise that it is the immediate welfare of rural people which is at stake not agricultural production. All of this would be academic except for the amount of money being spent for research to support development. Any serious effort to make production benefits an operational hypothesis for water research makes research activities and exceedingly expensive pretension leading to the absurdity of expatriate research scientists with annual costs in excess of the capital costs of an entire water scheme doing time and motion studies of overworked and underemployed people before and after a small pipe brings water a few miles closer to their doors. This may itself be one of the consumption functions of water development, but I think there are more efficient ways of allocating this welfare benefit.

26. Looking for large productive responses from small per capita capacity water schemes leads logically to certain other fallacious preconceptions, one of these is the concept of "released time". This raises the issue of the "benefits" of labor substitution.

27. 3) "Released time" is a meliorative term for labor replacement. It is frequently a euphemism for unemployment. It is not only naive, it is singularly misleading because premises or a priori assumptions about the opportunity costs of labor as well as the cultural values and socio-economic situation of the worker are inherent in the concept. Actually it is an hypothesis on the benefits of labor substitution being used as a ready-made proposition for exploring the "impacts" of labor substitution.

28. In regard to piped water, the implicit premise is that the people hauling water are doing so because water is a sheer necessity beyond price and there is no relationship between this man, woman or child's availability or willingness to carry water and the theoretical value of his labor. On the contrary, there is a direct relationship between the availability of the person carrying water and the value of his labor. If he had more productive things to do he would be doing them. The fact that it is water he is carrying instead of scraps of wood, empty wine bottles or rags in no way alters the economic implications of the activity.

29. The released time hypothesis requires us to accept a proposition that there is a compelling non-economic form of activity depriving a valuable man of his time much the same as asthma deprives a doctor or an attorney of his time. If he is cured of his asthma then think of how many more clients he can handle and the increase in fees he can realize. Economic theory accounts for behaviour in this model only at the point that the asthma is cured or the captivity of his labor--i.e. the necessity to have water--is broken. At this point the victim or beneficiary is transformed from non-economic man to economic man putting his gift of free time to good use by engaging in activities his captivity denied him and the lack of performance of which had been costing him and his nation either in the form of low yields on his labor-constrained shamba or wage opportunities forgone on a hot labor market. The released time proposition is as misleading here as it is in hypothesizing the "benefits" of electric kitchens to uneducated American housewives, or the snow plow to the Eskimo, or the cotton picking machine to the Mississippi sharecropper--or for that matter, to the U.S. economy.

30. The sociology and micro economics of the tasks being displaced are fundamental to predictions about what those performing them will do when "released" from their "drugery". Basically it boils down to the issue of whether water hauling is an economic activity or a disease. Of course if it is an economic activity, we must understand the existing system of distribution of the benefits of the existing water supply. The

role or economic significance of hauling cannot be understood until its place in this system is known. We know there will be differentials in the benefits from water in an area, a community and even a household. The same will hold true of the benefits of the labor of hauling. It's the familiar question of who gets what and how much. It is axiomatic that the new water technology will have differential impacts on people in some relationship to their roles or status positions in the old system.

31. I contend that whatever water hauling is--i.e. if it is captive labor--this is not a function of the existing water technology but rather a function of the prevailing micro economic system. This means that the key constraint is not the existing technology but the socio-economic position of the hauler. Substituting a pipe gravity system for a labor intensive hauling system would not benefit him except by increasing his leisure or idlesness in which case we can say he is better off but no richer--that is assuming he gets his share of the water. But one of the implications of water hauling as an economic activity is that there are others besides the hauler who benefit from his activity. Therefore piped water would not benefit haulers and non haulers equally because it brings the one who hired the hauler 10 gallons per day as well as saving him the cost of wages--whereas the hauler gets 10 gallons, no wages and leisure or open non employment. This would hold even where hauler and non hauler consumption were equal. But the chances are that the differentials in the distribution of the benefits of the old water system will prevail or even widen in the distribution of benefits of the new system. This brings me to the discussion of a fourth bias which pervades much of the literature on water research and water impact studies in East Africa.

32. 4) The concept of "areas" and the implicit assumption of area uniformity--i.e. the area in question lacks and internal socio-economic system and the articulation of its population with the larger socio-economic system is uniform. This poses the issue of the differential capacities within a development area to capture the benefits of a given input.

33. The concept of area produces a blind spot to the dynamics of impact. Typologies for development decision-making purposes should be by community, economic activity, or by socio-economic class, not by area. The integrity of any unit for purposes of generalizing about probable social and economic impacts is not an administrative boundary, as convenient as this may be. It is a function of socio-economic class. Also ethnicity

or language and culture plays a part, but this is a higher or more general criterion.

34. There are not "poor" areas and "rich" areas or "low potential" and "high potential". In both there will be micro strata of inequality--poorest, poor, less poor and less less poor--and benefits will be utilized accordingly. This is implicit in the definition of strata. Moreover the benefits of a given input will be captured unequally, many times increasing differentials in income which already exist. Thus a given beneficiary may be better off relative to his income before the input, but worse off in terms of his relative socio-economic position in the local system. Any given area has its own exchange system for goods and services reflecting income differentials and other micro inequalities. Opportunities are perceived and rationally exploited not by an area acting in concert, but in terms of the smallest economic decision making unit--the household. This is the micro firm. Just as firms compete, households and farms compete for benefits. The chances are the households and the individuals in the households who haul the water occupy the lower strata. If this is so then any strategy to improve the welfare or increase the output of these people specifically must be more than a glib general area approach. Otherwise it may turn out to be an irony, meaning that water piped ostensibly to help the poor haulers held captive by a primitive technology will benefit the haulers' employers and the 5 - 10 acre farmer more than the poor haulers, who if they farm at all, probably have the smallest acreages and poorest lands. This again implies that water development is postulated as a social good or a welfare input.

35. A lot of issues hinge on the key issue of whether a given water scheme is a strategy for increasing the welfare of beneficiaries or increasing their production. I think and unequivocal answer to this issue is basic to an effective strategy. The attitude of some researchers and planners may be, "Why not both?" My feeling is that the national policy encompassing many peoples, communities, economies and regions can have both objectives. But at the point of specific scheme planning, I contend the strategy must be consistently one or the other because the strategies are mutually contradictory. Regardless of the rationale, the procedures developed spellout the operational policy.

36. For instance the Kenyan strategy for rural water development is rationalized basically as a production input but then designed in such way as to preclude any real production gains because it is spread too thin i.e. to maximize the numbers of people served. So a production strategy is operationalised as a social good. Then planners revert once again to

production criteria by using potential for utilising water as a key selection criterion and insisting upon payment of fees because of projected increases in beneficiaries incomes. But then the welfare decision rule prevails again because there exists an effective practice of ignoring non payment of fees.

37. The effective strategy which emerges from these procedures can be illustrated by a hypothetical case--the case of the "Mountain Ridge" scheme. The area was selected partly because of its high agricultural production which means it has a relatively wealthy stratum of farmers. This should have alerted planners to expect that this group would be the largest users of water and would have the greatest capacity for increased use. Moreover one would also suspect that they were paying for their water hauling and had the greatest capability to pay for piped water. But then the scheme was designed for low per capita capacity--a social good criterion and fee collection is not enforced--another social good decision rule. Individual connections are provided with no meters or any technical feature for regulating consumption which in effect provides the technical capability to capture benefits in excess of the design.

38. The people in Mountain Ridge being human--i.e. economic man, the result is predicatable. A subsystem of water economics develops involving water shortages "pipe drouths" a black market distribution system and a black market pipe repair system. An enormous differential capacity to capture benefits results favouring of course the highest socio-economic stratum. The welfare aspects of the scheme have been subverted by the production aspects and the repayment prospects of the production aspects surverted by the welfare aspects. The poor haulers now have more leisure or obvious unemployment and must still frequently go to the river for their water. Larger farmers who originally had the agricultural capacity to utilize water in large amounts are doing so while at the same time saving wages previously paid haulers. What we have in effect is a welfare system the benefits of which are distributed in inverse proportion to the beneficiaries' needs and in direct proportion to capacity to pay.

39. Let me hasten to emphasize I am not saying this situation exists anywhere in Kenya, simply that it is hypothetically possible for it to exist given the present operational practices which, to me, seem to be the results of effeorts to interject the value of production fundamentalism into what is essentially a social demand situation.

III. 40. The role of social science at this stage of rural water development in Kenya--a summary.

41. Policy rationale and policy are two different things. The fact that scientists are now the chief architects of rationale makes no difference. Although this gives policy the formidable appearance of being a scientific process, it is in fact still a natural social action system including deciding which experts to hire to rationalize policy. These are biases which I see resulting from the confusion of macro economic rationale with the social, and political realities underlying Kenya's water policy. 1) an over emphasis on the singular importance of water development expenditures, 2) ignoring the sociology and micro economics of beneficiary populations, 3) an emphasis on production as the prime objective of water development, 4) and implicit reliance on cost/benefit criteria as the only operational index of performance.

42. Ironically there is a real cost/benefit issue--the strategy of putting water expenditures into fewer, large production oriented projects as opposed to mounting many small projects with high beneficiary densities and minimal per capita capacities. But all of the indicators I see infer that this is a closed issued socially and politically. Regardless of its rationale, water development policy is an expression of peoples' felt need. The program will continue regardless of the lack of empirical proof of net income gains. This plus the low per capita inputs of the schemes and the level of over-all water expenditures relative to expenditures for roads, harbours, hospitals, schools, television and other programs where cost/benefit criteria have yet to be developed; make cost/benefit studies for water a trivial but expensive exercise.

43. Does this mean there is no need for social science? I would say there is a need for a broad interdisciplinary social science. Since we are talking about a program which envisages touching literally every human being in Kenya by the year 2000, I would say we are talking about a human impact program. Modification of human systems and human behaviour is in involved prima facia. As with schools, hospitals and roads, the government should get the most effectiveness from its expenditures. There are bound to be production impacts, but the primary effects are the consequences in terms of human welfare. This is cost relevant. All behaviour is cost relevant. But the behaviour cannot be hypothesized without first knowing the sociology and micro economics of prevailing water systems.

44. What we have now in the rural areas of Kenya are human or labor intensive technologies for water procurement and distribution. What the Water Development Division is charged with doing is substituting capital intensive technologies in place of labor intensive. This will have social and economic effects --presumably beneficial. But in order to maximize the benefits we must do more than define impacts in terms of whole populations and areas. We must know differential impacts upon various institutions and socio-economic classes and various economic activities and exchange systems. I am not talking about baseline surveys, I am talking about knowing existing water systems and interconnectedness of these systems with the social and economic structure of the area or population in question. This does not mean intensive social and micro economic studies of every administrative location. It would mean studying water systems in sociological and micro economic context in contrasting cultural and ecological settings. Then valid survey instruments and procedures could be designed for use in any area which would provide criterial information quickly and cheaply.

45. These are some of the things I would like to know: The distribution system in terms of roles - e.g. haulers for self and other, haulers for self, and employers of haulers--techniques, equipment and units and amounts of exchange. The existing water consumption patterns in terms of quality, quantity and purpose. Then the comparison of roles in the distribution system with levels of consumption and the comparison of both of these schemes for classifying people with other status systems --age, sex, kinship, ceremonial position, political position, economic position, occupation, size of farm, type of farm etc.

46. It seems to me the theory underlying the significance of this information is consistent with economic theory. Given the card game the individual is in, and given the cards he has been dealt, he behaves rationally. Planners must know the rules of the game and the various hands players can be dealt before they can predict or intelligently modify their behaviour. For instance in heavy rainfall areas like Central Province, where production possibilities exist for water, it seems likely these possibilities have long since been utilized, albeit via labor intensive technologies. Water is not an absolute constraint as in arid lands. It is an economic constraint. That means a relative constraint--relative in terms of what each consumer is willing to pay or give in exchange for it and relative in the sense that some households

or farms lack it more than others. In the context of all the other production constraints that exist for small scale agriculture in heavy rainfall areas, I would hypothesize there is no shortage of water, there is no shortage of labor, but there is shortage of money. Therefore what does piped water save that is crucial? It saves money, but only for those who were paying for their water. For those who hauled their own water it saves his labor, already in over supply. For the professional hauler it gives him water in exchange for the little money he was getting, and for the water purchaser it is a direct cash savings. Hence free piped water to everyone in the scheme--large consumer and small consumer--i.e. rich and poor alike, will, in addition to bringing more leisure, increase existing income differentials, unless of course inversion measures were built into it such as a fee scale that charges higher rates in direct proportion to the quantity of water consumed. This of course would require meters.

47. This brings me to a final pressing issue for planning--the issue of selection criteria. In the sense of area selection this strikes me as an inappropriate concept. In the sense of selection of a scheme design it seems meaningful. What is needed are schemes designed to be class specific or behaviour specific, not area specific. Thus it may be theoretically valid to have the same basic human organization design in ecologically, culturally and economically diverse areas. For instance correction of inequality in water benefit may be a goal. On the other hand certain schemes may be designed purely on the basis of economic demand with repayment of capital and operating costs as a prime goal.

48. A repayment scheme might be something on the order of:

- Water Development Division contracts to put in main lines designed for high per capita capacity e.g. 50 - 100 gals. per family per day.
- all connections must be paid for by private consumers - this includes pipe, outlet system and meter according to standard specifications.
- all consumers pay on basis of repayment and operating costs according to metered consumption.

49. A rural welfare scheme might have the following features:

- low per capita capacity.
- communal points.
- no fee structure except nominal-- e.g. 7/- per year or 50 cents per month.
- some form of subsidy tax on local product--milk, coffee, tea, etc--to repay costs.

- or no repayment by beneficiaries at all.
- perhaps most important in this kind of design would be a maximum per capita limit on consumption. (I think this would be easier to organize than fee collection).

50. The problem of the priority by which administrative areas receive piped water is not a scientific question but a politico-administrative question. The kinds of data which would seem appropriate to feed into the decision making process are basic hydrological, demographic and cost data. Admittedly these data may be lacking in which case it would seem to be a matter of choosing tentative areas, then WDD (Water Development Division) developing more data from survey research for final selection. Data would be generated to substantiate three sets of criteria--need, social stability and cost.

1) need criteria:
- population size, nos. served per unit of expenditure.
- existing water system and where it fits in a typology of water systems.
  - natural hydrology of area: sources, quantity and quality of water.
  - water technologies: distances, gathering and distribution, approximate consumption per household.

2) social stability criteria--felt need for water in relation to means for water:
- enumeration and description of activities to promote improved water systems.
- expectations or aspirations for water obtained by means of a standardized semantic differential.

3) Cost criteria--estimates of costs of different types of schemes for the area.

All criterial data for the areas WDD has to choose among would be cross compared for final selection. Criterial data for appropriate scheme selection could be gathered at the same time.

51. Whether this research is performed by WDD or IDS (Institute for Development Studies) is not really important. What is important from my point of view is for research designs to assign central significance to the welfare effects of rural water development and recognize the sociology and micro economics of existing water systems as opposed to measuring, or worse still, hypothesizing differences in aggregate income effects of this or that scheme.

Notes and References

1. Dennis Warner,"A Preliminary Assessment of the Impact of Rural Water Supply upon Households and Villages", Dar es Salaam 31st March to 4th April, 1970. pp.2-3.

2. The United Republic of Tanganyika and Zanzibar, Five Year Plan for Economic and Social Development, 1st July 1965 - 30th June 1969 Vol.I, Dar es Salaam, Government Printer, 1964;

3. Republic of Kenya, Development Plan 1970 - 1974, 1969.

3. Carl G. Rosberg Jnr., & John Nottingham, The myth of 'mau mau' Nationalism in Kenya, 1966. United States of America, East African Publishing House, Nairobi, p.199.

4. Republic of Kenya, op.cit., p.366.

5. I.D. Carruthers, "Issues in Selection and Design of Rural Water Projects", Discussion paper No.88, Institute for Development Studies, University College, Nairobi, December,1969, p.4.

6. Ibid., p.6.

7. Republic of Kenya, op.cit., pp.148-150.